



E-commerce 2002 Highlights

- E-commerce, on a percent change basis, outperformed total economic activity in all four major economic sectors measured between 2001 and 2002.
- Business-to-Business activity, which depends critically on Electronic Data Interchange (EDI), dominated e-commerce.
- All industry groups in each sector participated in e-commerce.
- Most e-commerce occurred in a handful of industry groups within each sector.

This edition of *E-Stats* provides a snapshot of e-commerce activity for key sectors of the U.S. economy for 2002 and revises previously released data for 2001. The data are collected from over 135,000 manufacturing, wholesale, services, and retail businesses.

Note to reader

E-commerce data are collected in five separate Census Bureau surveys. These surveys use different measures of economic activity such as value of shipments for manufacturing, sales for wholesale and retail trade, and revenues for service industries. Consequently, measures of total economic and e-commerce activity differ in concept and definition among these sectors, and the total should be interpreted with caution. The Census Bureau's e-commerce measures include the value of goods and services sold online whether over open networks such as the Internet, or over proprietary networks running systems such as Electronic Data Interchange (EDI).

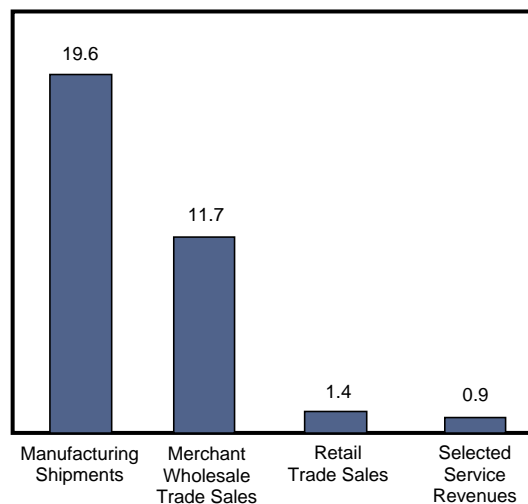
This report covers 1997 North American Industry Classification System (NAICS) industries that accounted for approximately 70 percent of the U.S. economic activity measured in the 1997 Economic Census. The report does not cover agriculture, mining, utilities, construction, nonmerchant wholesalers, and approximately one-third of service-related industries. See **Explanatory Notes** for more information on report coverage, methods, and data reliability. Measures of sampling variability for Tables 1-6 are presented in Tables 1A-6A.

This edition of *E-Stats* revises 2001 data released in March 2003. See **Explanatory Notes** for additional information on the revisions. All reported changes between 2001 and 2002 reflect revised data for 2001.

E-commerce—both its dollar value and share of economic activity—varied markedly among key economic sectors.

- Manufacturing led all industry sectors with e-commerce shipments that accounted for 19.6 percent (\$752 billion) of the total value of manufacturing shipments.
- Merchant Wholesalers ranked second with e-commerce sales that represented 11.7 percent (\$320 billion) of their total sales.
- Retail Trade, the focus of much e-commerce attention, had e-commerce sales in 2002 that accounted for 1.4 percent (\$44 billion) of total retail sales.
- E-commerce revenues for the special grouping of service industries created for the *E-Stats* reports, Selected Service Industries, accounted for 0.9 percent (\$41 billion) of total revenues for these industries.

E-commerce as Percent of Total Value: 2002



B-to-B and B-to-C E-commerce

In 2002, 93 percent of e-commerce was B-to-B. While the surveys did not collect separate data on business-to-business

U.S. Shipments, Sales, Revenues and E-Commerce: 2002 and 2001

[Shipments, sales and revenues are in billions of dollars.]

Description	Value of Shipments, Sales, or Revenue				Year to Year Percent Change		% Distribution of E-commerce	
	2002		2001					
	Total	E-commerce	Total	E-commerce	Total	E-commerce	2002	2001
Total *	14,675	1,157	14,585	1,080	0.6	7.1	100.0	100.0
B-to-B*	6,582	1,072	6,672	1,010	-1.3	6.1	92.7	93.5
Manufacturing	3,840	752	3,971	724	-3.3	3.8	65.0	67.0
Merchant Wholesale	2,742	320	2,701	286	1.5	11.7	27.7	26.5
B-to-C*	8,093	85	7,913	70	2.3	21.4	7.3	6.5
Retail	3,230	44	3,157	34	2.3	29.3	3.8	3.2
Selected Services	4,863	41	4,756	36	2.2	15.0	3.5	3.3

* We estimate B-to-B and B-to-C e-commerce by making several simplifying assumptions: manufacturing and wholesale e-commerce is entirely B-to-B, and retail and service e-commerce is entirely B-to-C. We also ignore definitional differences among shipments, sales, and revenues. The resulting B-to-B and B-to-C estimates, while not directly measured, show that almost all the dollar volume of e-commerce activity involves transactions between businesses. See the "Note to reader" for cautions relating to the interpretation of the "Total" shown here.

(B-to-B) and business-to-consumer (B-to-C) e-commerce, the table above shows that e-commerce represented a much larger share of total economic activity in sectors that sold primarily to other businesses.

Manufacturing

The value of U.S. manufacturing e-commerce shipments (e-shipsments) was \$752 billion in 2002, an increase of 3.8 percent from revised 2001 e-shipsments of \$724 billion. E-shipsments, as shown in Table 1, accounted for 19.6 percent of the value of all shipments from U.S. manufacturing plants in 2002, a slight increase from 2001. This information was collected in the 2002 Annual Survey of Manufactures (ASM), a survey of more than 55,000 manufacturing plants.

E-shipsments were concentrated. Seventy-one percent of all e-shipsments in 2002 occurred in five industry groups. Transportation Equipment was the largest industry group, accounting for 40 percent (\$297 billion) of total manufacturing e-shipsments. The large e-shipsments share for Transportation Equipment was consistent with the substantial role that group plays in Manufacturing, where it accounted for 16 percent of all shipments. It also was

consistent with the long history of EDI use in this group.

E-shipsments were pervasive in manufacturing, accounting for at least 10 percent of shipments in 15 of 21 industry groups. The e-shipsments share of total shipments was largest in Transportation Equipment (48 percent), followed by Beverage and Tobacco (44 percent).

E-shipsments in manufacturing fared somewhat better than total shipments between 2001 and 2002 as manufacturing declined 3.3 percent and e-shipsments increased 3.8 percent. The industry group that contributed most to this difference was Computer and Electronic Products. In this industry, e-shipsments were unchanged compared to a \$76 billion decline for total shipments (a decline of 18 percent).

Merchant Wholesale Trade

U.S. merchant wholesale e-commerce sales (e-sales) reached \$320 billion in 2002, an increase of 12 percent over revised 2001 e-sales of \$286 billion. E-sales, as shown in Table 2, represented 11.7 percent of total merchant wholesale sales in 2002, up from 10.6 percent in 2001.

This information was collected in the 2002

Annual Trade Survey, a survey of approximately 6,700 merchant wholesalers. Merchant wholesalers take title to the goods they sell. Table 2 therefore excludes nonmerchant wholesalers such as manufacturers' sales branches and offices, agents, brokers, commission agents, and electronic marketplaces and exchanges. In the 1997 Economic Census, nonmerchant wholesalers accounted for approximately 43 percent of total wholesale trade sales.

E-sales were concentrated, with 62 percent of total e-sales by merchant wholesalers occurring in three industry groups. Drugs and Druggists' Sundries wholesalers accounted for 35 percent (\$111 billion); Motor Vehicles, Parts and Supplies wholesalers, 17 percent (\$53 billion); and Professional and Commercial Equipment and Supplies wholesalers, 10 percent (\$33 billion). These same industry groups accounted for about 62 percent of e-sales by merchant wholesalers in 2001.



While all merchant wholesale industry groups had some e-sales, opportunities for expanded e-sales remain. Less than half of the industries or industry groups made 10 percent or more of their total sales over online networks. Drugs and Druggists' Sundries wholesalers' e-sales were 48 percent of their total sales, Motor Vehicles, Parts and Supplies wholesalers' e-sales represented 25 percent of their total sales, Apparel Piece Goods and Notions wholesalers' e-sales were 15 percent of total sales, Computer Equipment and Supplies wholesalers' e-sales accounted for 13 percent of total sales, Hardware, Plumbing and Heating Equipment wholesalers' e-sales were 12 percent of total sales, and Furniture and Home Furnishings wholesalers' e-sales were 11 percent of their total sales.

E-sales by Merchant Wholesalers outpaced total sales from 2001 to 2002. E-sales were up by 11.7 percent, compared to a 1.5 percent increase in total sales. More than half of the growth in e-sales came from Drugs and Druggists' Sundries, where

e-sales grew \$14 billion and sales grew \$32 billion.

Merchant Wholesalers achieved e-sales, as Table 3 shows, primarily through EDI networks. All merchant wholesale industry groups used EDI networks, and most of the 18 industry groups generated more than two-thirds of their e-sales through EDI networks. In 2002, EDI sales for merchant wholesalers totaled \$275 billion and accounted for 86 percent of their e-commerce sales.

Selected Service Industries

U.S. e-commerce revenues (e-revenues) for selected service industries were \$41 billion in 2002, an increase of 15 percent over revised 2001 e-revenues of \$36 billion. As shown in Table 4, e-revenues accounted for 0.9 percent of total revenues in these sectors.

Four groups accounted for 48 percent of total Selected Service e-revenues. Travel Arrangement and Reservation Services accounted for 15 percent of total Selected Service e-revenues, and Publishing, including newspaper, periodical, book, and software publishers, accounted for an additional 13 percent. Securities and Commodity Contracts Intermediation and Brokerage; and Computer Systems Design and Related Services were each 10 percent of total e-revenues.

The e-revenues share of total revenue was largest in Travel Arrangement and Reservation Services, accounting for 24 percent of the total revenue for this industry group. Online Information Services was the only other selected service industry group where e-revenues represented more than 5 percent of total revenues.

Total revenues grew 2 percent between 2001 and 2002 in the Selected Services Industries while e-revenues grew by 15 percent. Within Selected Services Industries, four groups showed strong growth in e-revenues - Selected Transportation and Warehousing, Selected Finance, Selected Professional, Scientific, and Technical Services, and Selected Other Services.

The Selected Services Industries total provided in Table 4 is not an official NAICS grouping, but rather the sum of the bolded groups shown in the table. Some of these groups are not complete. Incomplete industry coverage within a group is denoted by the absence of a NAICS Code for a Table 4 bolded row and the use of "Selected" in the group description. Table 4 covers about two-thirds of the NAICS service-related industries included in the 1997 Economic Census. This information was collected in the 2002 Service Annual Survey, a survey of more than 58,000 firms.

Retail Trade

U.S. retail e-commerce sales (e-sales) reached \$44 billion in 2002, an increase of 29 percent over revised 2001 e-sales of \$34 billion. Retail e-sales, as shown in Table 5, accounted for 1.4 percent of total retail sales in 2002, up from 1.1 percent in 2001. This information was collected in the 2002 Annual Retail Trade Survey, a survey of approximately 19,000 retailers.

E-sales were concentrated in two groups that accounted for over 90 percent of retail e-sales: Nonstore Retailers, and Motor Vehicle and Parts Dealers. Nonstore Retailers accounted for 75 percent (\$33 billion) of retail e-sales. Motor Vehicles and Parts Dealers was the next largest with 16 percent (\$7 billion) of total retail e-sales.

The Electronic Shopping and Mail-Order Houses industry accounted for almost all of Nonstore Retailers e-sales. This industry includes catalog and mail-order operations, many of which sell through multiple channels, and "pure plays," retail businesses selling solely over the Internet. In addition, this industry includes e-commerce business units of "brick and click" retailers, if the e-commerce group operates as a separate unit and is not engaged in the online selling of motor vehicles. The decision rules used to determine what to include in the Electronic



Shopping and Mail-Order industry result in almost all the sales and e-sales of "brick and click" retailers being included in this industry which, in turn, reduces the e-sales shown in other retail groups. The exception to this rule is the online sales of motor vehicles. The online sales of "brick and click" vehicle dealers are shown in the Motor Vehicles and Automotive Equipment group. This exception reflects the continued importance of the dealership in actually closing the online deal and delivering the vehicle.

Retail e-sales growth of 29 percent between 2001 and 2002 strongly outpaced total retail sales growth of 2 percent. Within Retail, e-sales of Nonstore Retailers grew 28 percent between 2001 and 2002, in contrast to the 3 percent increase in this group's total sales. For Motor Vehicle and Parts Dealers, total sales showed little change while e-sales rose 36 percent.

Table 6 provides detailed information on the kinds of merchandise sold by businesses classified in the Electronic Shopping and Mail-Order Houses industry. The leading merchandise category within this industry was Computer Hardware with e-sales of \$6 billion, followed by Clothing and Clothing Accessories (including footwear) with \$4 billion in e-sales.

For the Electronic Shopping and Mail-Order Houses industry, e-sales accounted for 28 percent of total sales in 2002, compared to 23 percent in 2001. Merchandise categories with the highest percent of online sales included Books and Magazines, and Electronics and Appliances both with 46 percent of sales online. In fact, online sales were substantial in almost all merchandise lines.

More recent data on e-sales for retail trade are available as part of the ongoing quarterly retail e-commerce series. Data for 4th quarter 2003 and the preliminary estimate for the year 2003 were released on February 23, 2004.

U.S. retail e-sales were \$17 billion in the fourth quarter of 2003 and accounted for 1.9 percent of total retail sales (\$918 billion) in that quarter. The preliminary estimate of

total e-sales for 2003 is \$55 billion, accounting for 1.6 percent of total retail sales for 2003. The most recent data are available at <http://www.census.gov/estats>.

Explanatory Notes

General

The e-commerce estimates in this release are based on data collected from five surveys conducted by the U.S. Census Bureau: the 2002 Economic Census and 2002 Annual Survey of Manufactures (ASM), the 2002 Annual Trade Survey (ATS), the 2002 Service Annual Survey (SAS), and the 2002 Annual Retail Trade Survey (ARTS). These surveys were conducted independently. Measures of total economic activity and e-commerce are presented in this report to provide a broad perspective of e-commerce activity across the four sectors. Brief descriptions of the survey methods are given below. Industry classifications used in this report are based on the 1997 North American Industry Classification System (NAICS). Information about NAICS and additional detail about coverage, sample design and estimation methodology for the annual surveys may be found online at www.census.gov/estats. In addition, all current and prior reports, historical data tables, and past research papers are available at this same website.

Definitions of Economic Activity

The five surveys use different measures of economic activity.

ASM and the Manufacturing Sector of the 2002 Economic Census. "Value of Shipments" is the measure used in both the ASM and Economic Census. It is the market value of all commodities shipped from a plant. Value of shipments includes shipments to outside customers as well as to affiliated plants.

ATS and ARTS. "Sales" is the measure used in the ATS and the ARTS. Sales are the dollar value of transactions between the reporting firm and its customers. Sales include transactions to foreign affiliates, but exclude transactions among domestic affiliates.

SAS. "Revenue" is the measure used in the SAS. Revenues are the dollar value of transactions and contracts between the reporting firm and its customers. These values include services performed for foreign affiliates, but exclude transactions among domestic affiliates. Revenue includes the total value of service contracts, the market value of compensation received in lieu of cash, amounts received for work subcontracted to others and other industry-specific items.

Importance of EDI Networks

The dominant position of B-to-B e-commerce reflects the long-standing use of EDI in manufacturing and wholesale trade. EDI is the exchange of computer processable data in a standard format between organizational entities. There are two EDI standards. The Accredited Standards Committee X12 is the standard in North America, while UN/EDIFACT is the standard for Europe and most of Asia. The format and the data associated with any particular EDI transaction are defined in the X12 or EDIFACT EDI standards. While EDI transactions often are conducted over Value Added Networks, they also can be transmitted over open networks. EDI sales were separately identified for the first time in the 2000 Annual Trade Survey.

Survey Methods

Annual Survey of Manufactures and the Manufacturing Sector of the Economic Census

The e-commerce estimates for 2002 were derived from the ASM while the estimates for total value of shipments were derived from the manufacturing component of the 2002 Economic Census. The manufacturing universe is comprised of approximately 345,000 plants. The ASM collects data annually from a probability sample of more than 55,000 manufacturing plants with five or more employees. In the census, data are collected from all plants with five employees or more. For both surveys, data for plants with less than five employees are estimated using information obtained from administrative sources.

For the 2002 and 2001 survey year, questions about e-commerce were included on the ASM or census questionnaire along with questions about such things as employment, payroll, value of shipments, cost of materials consumed, and capital expenditures. For years prior to 2001 (2000 and 1999) the e-commerce data while collected from the same panel, were collected on a separate questionnaire. In all years, information for nonresponding plants was imputed using information from responding plants with similar characteristics.

E-commerce estimates for the NAICS subsectors were calculated by summing both the reported and the imputed plant data. For each plant the online data were weighted by the reciprocal of the probability of the plant's inclusion in the ASM sample.



These estimates were then linked to the 1997 Economic Census results to reduce sampling and non-sampling errors. Total value of shipments statistics were obtained directly from the manufacturers included in the 2002 Economic Census and include data for all establishments primarily engaged in manufacturing in the 2002 Economic Census. The estimates for 2001 included in this report were revised from those originally published in the March 2003 edition of *E-Stats*. These revisions were small.

Approximately 5,000 establishments with e-commerce activity in 2001 indicated that they did not have any e-commerce activity in 2002. After contacting a sample of respondents, we determined that a significant number of these respondents misinterpreted the e-commerce question on the 2002 Economic Census manufacturing questionnaires and reported incorrectly. Based on the results of this work, we adjusted 2002 e-commerce estimates approximately 10 percent to compensate for this reporting error. While the adjustments were applied in a systematic fashion, we recommend caution when using data at

more detailed levels and when making period-to-period comparisons.

Annual Trade Survey, Service Annual Survey, Annual Retail Trade Survey

The ATS measures the economic activity of merchant wholesale firms with paid employees. Merchant wholesale firms are those that take title to the goods they sell. Data are collected annually from approximately 6,700 firms that represent the universe of approximately 300,000 merchant wholesale firms with paid employees.

The SAS measures activity of employer firms classified in nine service-related sectors: Transportation and Warehousing; Information; Finance and Insurance; Real Estate and Rental and Leasing; Professional, Scientific, and Technical Services; Administrative and Support and Waste Management and Remediation Services; Health Care and Social Assistance; Arts, Entertainment and Recreation; and Other Services. Data are tabulated annually from more than 58,000 firms representing the universe of approximately 3 million establishments with paid employees.

The ARTS measures the economic activity of all retailers with and without paid employees. The ARTS collects data annually from approximately 19,000 firms with paid employees. Sales for firms without paid employees are estimated using administrative records. The Retail Trade universe contains approximately 2.5 million firms.

For these three surveys, stratified random samples of firms were drawn from a sampling frame constructed using information from the 1997 Economic Census and updated with information from the Census Bureau's Business Register. The samples were subsequently updated to represent employer firms in business during 2002.

All wholesale, service, and retail firms mailed in the surveys were asked to report total and e-sales/e-revenue for 2002. Wholesalers were asked to report e-sales

made through EDI networks. Retailers in the Electronic Shopping and Mail-Order Houses industry were also asked to report total sales and e-sales for 2002 for specific merchandise lines. E-commerce data for nonresponding employer firms and all retail nonemployers were imputed from responding firms within the same kind of business and sales size category.

Estimates of total sales/revenues and e-sales/e-revenues were calculated by summing data (both reported and imputed) weighted by the reciprocal of the probability of the firm's inclusion in the appropriate sample. The estimates in this report have been linked to the 1997 Economic Census to reduce sampling error and to allow comparability with the census results.

The data for 2001 included in this report are revised from those originally published in the March 2003 edition of *E-Stats*. For retail, the revisions were modest and were primarily the result of respondents correcting data for 2001.

For merchant wholesalers, the original 2001 e-sales estimate was revised up by \$16 billion. During our review of the 2002 EDI sales, we found a number of respondents reporting large amounts of EDI in 2002 but no EDI in 2001. We contacted these respondents to determine if there should have been EDI sales in 2001. In most cases, there should have been EDI sales, and we were able to obtain new data. We made these corrections to 2001 EDI sales, which also resulted in an upward revision in the 2001 e-commerce sales estimate.

Reliability of Estimates

The estimates in this release are based on sample surveys and are subject to sampling and nonsampling errors. Sampling error occurs because only a subset of the entire population is measured. Nonsampling error encompasses all other factors that contribute to the total error of a sample survey estimate and may also occur in censuses. Changes in data collection methods, report forms, and imputation methods all can affect the nonsampling error.

Tables 1A through 6A show standard errors for estimates of percentages and coefficients of variation for estimates of total dollar value. The one exception occurs in Table 1A in which there are no standard errors or coefficients of variation associated with the 2002 column for total value of shipments. The reason is this data is obtained directly from the manufacturing component of the 2002 Economic Census. The remaining columns in Table 1 are subject to sampling error. The standard error measures the extent to which estimates derived from all possible samples drawn using the same design differs from the average of these estimates. The coefficient of variation (expressed as a percentage) is the standard error of the estimate divided by the estimate. Note that standard errors and coefficients of variation are estimates derived from the sample and are also subject to sampling error.



The coefficients of variation presented in the tables may be used to compute confidence intervals about the sample estimates. The particular sample used for each survey included in this report is one of a large number of samples of the same size that could have been selected using the same design. In about 9 out of 10 (90 percent) of these possible samples, the estimates would differ from the results of a complete enumeration by less than 1.645 times the percentage shown.

To compute a 90-percent confidence interval for an estimate of level, multiply the estimate by its coefficient of variation and then by 1.645. This amount is then added to and subtracted from the estimate to give the upper and lower bounds of the interval. As an example, suppose the estimated total value of shipments is \$51,770 million and the estimated coefficient of variation for this estimate is 1.3 percent (0.013). Multiplying \$51,770 million by 0.013 and then by 1.645 gives \$1,107 million. Subtracting \$1,107 from and adding \$1,107 to \$51,770 million gives a 90-percent confidence interval of

\$50,663 million to \$52,877 million. Confidence statements for estimated percentages are computed in a similar manner.

One source of nonsampling error is the inability to obtain information about all cases in the samples.

Percentage of Total and E-commerce Sales Obtained from Reported Data

Survey	Total Sales	E-commerce Sales
ASM	90	77
ATS	90	93
ARTS	92	89
SAS	87	81

Other sources of nonsampling error include response errors, unclear definitions, differences in the interpretation of questions, mistakes in recording or coding the data obtained, and other errors of collection, response, coverage, and estimation of missing data. Although no direct measures of these sources of nonsampling error have been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize their influence.



E-Stats Reports

All *E-Stats* reports are available at www.census.gov/estats.

Future Reports

- Quarterly retail e-commerce data will be released on May 21, August 20, and November 19, 2004.
- *E-Stats* 2003 will be released in Spring 2005.
- E-commerce data from the 2002 Economic Census will be released in Winter 2005.

Prior Reports, Historical Data Tables, and Research Papers

All prior reports, historical data tables, and past research papers, are available at www.census.gov/estats.

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The Census Bureau is committed to providing the business community and policymakers with more relevant and useful economic statistics. We thank all the businesses that participated in these surveys. Their cooperation and continued participation is vital to the future success of the economic statistics programs.